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MACHINE-TOOL DESIGN FIELD ACTIVE; STEEL SAVING EMPHASIZED

DISCUSSES NEW GRINDING MACHINES, LATHE -- Stanki i instrument, No 5, May 49

The designers' collective of the Moscow Grinding Machine Plant headed by chief designer K. A. Samoylov, has developed high-production special automatic machine tools for grinding parts and bearings of agricultural machines under conveyer methods of production. Up to this time these operations were highly labor-consuming. The productive capacity of these machines is 8 - 10 times greater than those used previously for machining of these parts.

New machine tools, Models 3772-N17, 3772-N19, 3772 N29, and 3772-N31, have been produced in considerable quantities and are operating successfully in agricultural machine building.

In 1948 Engineers B. T. Breyev and I. G. Klimenko of the ENIMS completed work on automatic grinding units for cylindrical grinding machines. The ShA-1 unit and the general purpose 316E unit, based on the Sha-1 for cylindrical grinding, proved highly useful and showed extensive possibilities for further development. On the basis of this unit various designs of special machine tools can be developed for grinding crankshafts, camshafts, and other parts in mass production. The Model 1932 (K-175) multicutter semiautomatic lathe for rough turning of locomotive axles was developed at the Krasnyy proletariy Plant and the ENIMS under the leadership of Engineers A. G. Filatov, B. I. Kirillin and G. I. Kamenetskiy. These machine tools are used at locomotive-building plants, and have increased labor productivity six - seven times.

CUT RACKS ON SCREW-CUTTING LATHE -- Stanki i instrument, No 5, May 49

It is very frequently necessary to cut gear racks in mechanical and repair shops but due to the lack of special machine tools, it is not always possible to obtain the correct pitch by machining according to generally accepted methods.

A method has been suggested for machining gear racks which has the following advantages: (1) the time required for cutting racks is two - three times less than by milling on a horizontal milling machine; (2) a 4th-class machinist can do the job; (3) cutting is a great deal more accurate and can be done in any repair shop having a screw-cutting lathe; (4) a longer rack can be cut than on the ordinary milling machine. On a machine tool with a distance of 1,000 millimeters between centers, it is possible to cut a rack having a length of 300 - 350 millimeters.

A chuck mounted on the spindle of the headstock of the screw-cutting lathe holds a standard hob cutter. On the bed of the screw-cutting lathe, instead of the carriage with a cutter holder, an ordinary machine vise or special attachment which holds the rack is installed. The rack (in vise or attachment) is set according to the tooth pitch. The rest, holding the rack, travels back and forth until the required tooth profiles are obtained throughout the width of the rack.

This method is suggested for cutting steel gear racks with a module of 1.5 millimeters and bronze racks with a module of 2 millimeters. After inspecting all elements of the tooth and surface finish, it was established that the pitch accuracy and surface smoothness was considerably higher than that achieved by milling on a horizontal milling machine.

The following rates of speed were used for cutting gear racks; for steel racks having 1.5-millimeter module, 150 cutter rpm; for bronze racks having 2-millimeter module, 200 cutter rpm; the feed per pass is 2 millimeters.

TOOTH GROOVES SAVE CUTTER -- Stanki i instrument, No 4, Apr 49

Frequent cutter breakage occurred in cutting textolite blanks with standard disc cutters, 2 - 4 millimeters wide, made from E1-18 steel. A wedging in the material being cut, caused by heat deformation, caused this breakage.

Engineers F. K. Prilutskiy and A. A. Nazarov of the technology shop introduced a special grinder, on which every fourth tooth of the cutter was made with a 15-millimeter groove. The deformation caused by the generated heat was eliminated, the cutter worked more efficiently and without jamming, and had longer life.

NEW ALLOY SAVES HIGH-SPEED STEEL -- Stanki i instrument, No 5, May 49

GPF alloy, developed by and named after Engineers Golovachev, Petropavlovskiy, and Fominskiy, is used for soldering cutting edges to tools. The cutting parts are inserted into the tool shank, which is made from structural steel, and brazed with copper-iron-nickel alloy. The tool is annealed, machined, and subjected to standard heat treatment, i.e., hardened and tempered.

GPF alloy consists of copper, iron, and nickel with an addition of manganese and silicon. The alloy is of two-phase structure: nickel, manganese silicon, and iron in copper; and nickel, manganese, and silicon in iron. The solder has good flowability assuring a full and deep fusion and permitting a soldering and hardening temperature internal of 1,210 - 1,330 degrees without disturbing the rigidity of the soldered joint.

With the use of this alloy a rigid monolithic tool is obtained, not inferior in operation to a one-piece tool. Thus, a saving of up to 75 percent in high-speed steel is effected in comparison with the one-piece tool. GPF alloy is recommended for use on counterbores, reamers, drills, millers, and other tools.

DESCRIBES MULTIPURPOSE PNEUMATIC TOOL -- Stanki i instrument, No 4, Apr 49

The Type PM-2 pneumatic machine is intended for boring out pipes up to 120 millimeters in diameter and for machining large-diameter holes, including drilling, reaming, and threading. It can also be used in operations where it is technologically unwise to use stationary mechanized equipment, particularly in boiler, steam engine, and ship manufacture.

The compressed air coming from the compressor through a rubber hose must have a pressure of 5 atmospheres. The rate of compressed air consumption is 4 - 5 cubic meters per minute. Capacity is 3 - 3.5 horsepower. The spindle rpm while the machine is idling is 90 - 100.. The weight of the machine is 36 kilograms with aluminum body and 52 with a cast iron body.

A rotor-type machine having a two-stage reducer and planetary gearing, it is made up of the following basic units: (1) a control which starts, stops, and reverses the machine; (2) a tube end control mechanism; (3) a reducer which decreases the number of spindle revolutions and correspondingly increases the twist moment; (4) a feed gear and (5) a tool-holding device

CRITICIZES CUTTER BLADE STANDARD -- Stanki i instrument, No 4, Apr 49

The shapes of cutter blades made from high-speed steel, according to GOST 2379-44, do not satisfy Soviet machine-building plants.

When the blades made according to the GOST are soldered to the cutter holder, the blade protrudes from all sides and as a result does not have proper clearance angles.

To give the blade clearance angles, it is necessary to rough it on a grindstone. Consequently, a large amount of difficult-to-obtain material is removed, the carborundum wheel is worn, and a great deal of labor and time is expended. The cutter, on the other hand, loses its cutting capacity when it is incorrectly ground.

For eliminating these deficiencies, clearance angles can be given to standard blades by milling. After soldering the blade to the holder, the cutter can be sharpened immediately.

The milling of blades for clearance angles is slightly more complex than the manufacturing of standard blades, but they pay for themselves in saving effected by eliminating roughing operations and by the improved quality of cutters.

The plant which conducted this experiment suggests that this method be followed by other plants and that the GOST 2379-44 be revised.